AES solar systems

INSTALLATION MANUAL

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1. GENERAL DATA

1.1 Health and Safety

Always assess risks prior to commencement of any work on the solar system. Take all necessary precautions to eliminate, or minimise to a safe level, any potential risks. Potential hazards can result from high temperatures of solar components (including escaping steam), working at height / roofwork, electrical work, manual handling and working in confined spaces. Keep the solar collector covered during any works. Wear appropriate PPE at all times.

Safety precautions: All works should be carried out in accordance with current health and safety regulations and recommendations.

The failure to use proper fall prevention systems may result in serious or lethal injuries. Prevention systems need to be certified and tested by relevant bodies. Systems are to be fixed above the users and to load bearing structures.

Be aware of live cables and connections.

Safety helmets should be worn on site during installation.

Safety boots should be worn on site during installation.

Safety goggles should be worn when drilling and cutting during installation.

Wear cut-resistant safety gloves during installation.

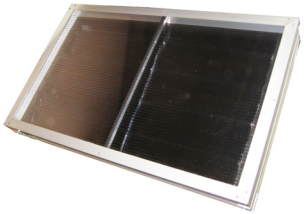
Please refer to appendix no.1 for a full list of Standards and Regulations relevant to the design, installation, commissioning and maintenance of a solar water heating system.

1.2 Delivery and Handling

All solar components are supplied from the factory securely packaged. The solar collector should be handled with care. Always store the collector in its original packaging and in the indicated upright position. Placing anything on the front or back of the collector may cause damage. Proprietary lifting equipment should be considered where the collector is to be installed in generally less accessible positions. At least two persons should be in charge of the collector when manoeuvring about site.

1.3 Inspection

Before beginning the installation of the system examine the contents and determine that all components are correct and present, taking care when removing from the packaging. The basic AES solar system includes:



High efficiency, lightweight solar collector.

Fixing brackets (flat bar as standard).

Solar Pump Station: Twin Line complete with built in de-aerator and flowmeter.

Purpose built solar cylinder.

Differential temperature controller.

Solar rated expansion vessel.

Approved solar premixed antifreeze solution.

Upon requesting an AES Solar kit, we can also provide all additional accessories deemed necessary to complete your bespoke system including insulated pipework, connection fittings and weathering slates.

1.4 Important Installer Information:

Only competent person(s) should undertake the installation of the solar water heating system. Necessary skills are required in plumbing, electrical, roof work and access work. Installers should have a high level of technical knowledge, be familiar with tools of the trade and have experience in current best practice.

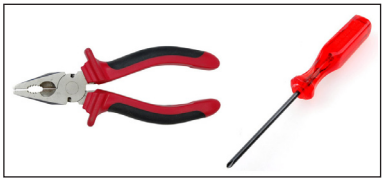
- Temperatures within the solar circuit can be in excess of 100°C, therefore suitable pipework, supports, fittings and insulation should be used, copper tubing is the most appropriate, or stainless steel flexi. For sizing see section 4.1 Pipe Sizing and Materials. Design to minimize pipe runs and bends in the pipework.
- Under no circumstances should plastic pipes or pipe clips, soft solder fittings or standard insulation be employed.
- We recommend the use of compression fittings, brazing or solar rated press fit within the solar system. Do not use soft solder.
- Insulation of the Domestic Hot Water cylinder should be at least equivalent to current best practice. All pipework should be insulated with high temperature insulation able to withstand temperatures up to 150°C.
- Use a fused switch for the electric wiring.
- The solar collector can reach very high temperatures when exposed to sunlight. Cover the collector during system installation. Do not remove covering until the system is ready for commissioning.
- The solar system should have adequate frost protection: Fill the system with a suitable solar antifreeze fluid. Always read the solar antifreeze fluid label; water should not be added to any premixed anitifreeze fluid under any circumstances. The mains water supply should not be connected to the closed loop solar circuit.
- In hard water areas, the high temperatures experienced in solar cylinders can give rise to the accumulation of limescale. Using the differential controller the system can be set to a maximum store temperature of 60°C. Limescale build-up will not occur within the loop of the indirect solar circuit.
- Between 20°C and 46°C there is an increased risk of legionella bacterial growth within the DHW system. Solar water heating systems must have an auxiliary means of raising the temperature to at least 60°C during winter months or days with little solar availability.
- The solar water heating system must meet the requirements for electrical earthing and bonding in accordance with IEE Wiring Regulations.

1.5 Tools you will need for the job:

To ensure a problem free installation of the system the following tools and equipment are recommended:

Safety Equipment

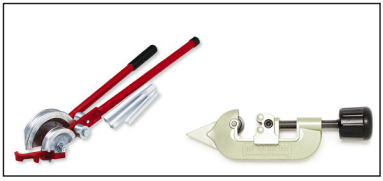
Claw Hammer & Adjustable Wrench



Pliers and Screwdriver(s)

Wire Cutters & Crimpers

Measuring Tape



Pipe Bender, Cutter & De-burrer

Power Drill

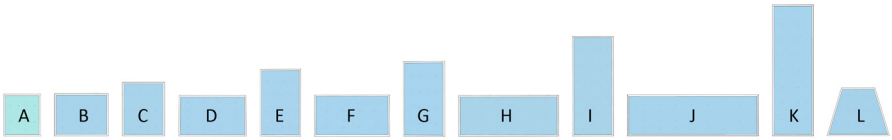
Spirit Level & Ladder

Stillson Wrench & PTFE Tape

Chalk & Chalk Line

Slaters Ripper

2. TECHNICAL SPECIFICATION:



MODEL	HEIGHT	WIDTH	GROSS AREA	APERTURE AREA	NET WEIGHT
	mm	mm	m ²	m ²	kgs
A	1175	1032	1.2	1.05	14
B	1175	1500	1.7	1.58	18
C	1500	1175	1.7	1.58	18
D	1175	1945	2.2	2.05	23
E	1945	1175	2.2	2.05	23
F	1175	2130	2.5	2.26	25
G	2130	1175	2.5	2.26	25
H	1175	2880	3.3	3.08	30
I	2880	1175	3.3	3.08	30
J	1175	3770	4.4	4.24	41
K	3770	1175	4.4	4.24	41
L	Bespoke - sizes and weights vary				

All collector models have a maximum depth of 110mm

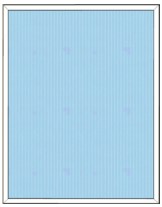
Collector type:	Flat Plate, tube in fin – metallurgically bonded.
Test pressure:	15bar
Min. Collector Pressure:	0.5bar
Max. operating pressure:	10bar
Pressure drop:	10 kPa at 0.03 litre/sec/m² of collector area
Fluid content:	Maximum 0.6 litres per 1m² of collector area
Transfer fluid:	Premixed high temperature antifreeze fluid
Absorber insulation:	Rigid PIR foam, manufactured with zero ODP
Connections:	15mm copper (Serpentine) 22mm copper (H&R)
Max. stagnation temp.:	185ºC

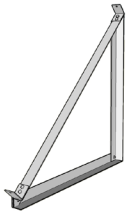
3. ABOVE ROOF WORK - 1ST FIX:

3.1 Roof Mounting

Determine the position of the collectors on the roof, having regard for appearance and any potential shading. To maximise the solar gain of the system in the UK the preferred angle for fixing AES collectors is in the range of 15 to 50 degrees within the orientation of southeast to southwest, due south being the optimum. Installations outside these parameters are possible. Contact AES for advice.

Each collector is supplied complete with fixing brackets (flat bar as standard), which should be secured tightly to the main structure of the building. The number of fixings varies according to the size of the collector. The following bracket requirements are recommended, as outline guidance only, for buildings of less than 15m height, in areas of insignificant topography and wind speeds, at an altitude below 300m. Any concerns regarding snow and wind loads, please refer to 'BS6399 Loading for Buildings', or you can contact AES for further advice.

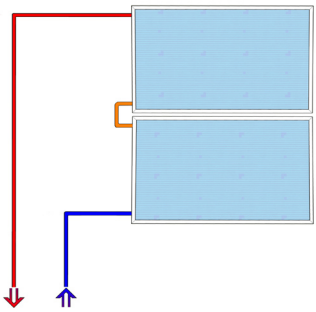




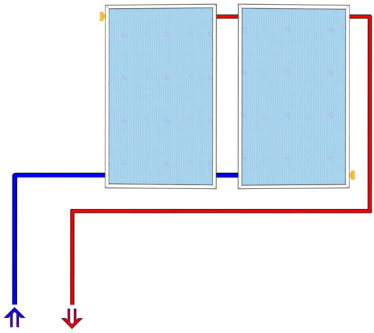
Collector Type	Flat Bracket Kit	A-Frames (Flat Roof/Wall Mounting)
1.7, 2.2, 2.5	4 Brackets (2 top, 2 bottom)	2 Frames
3.3	6 Brackets (3 top,3 bottom)	3 Frames
4.4	8 Brackets (4 top, 4 bottom)	3 Frames

3.2 Collector Arrays

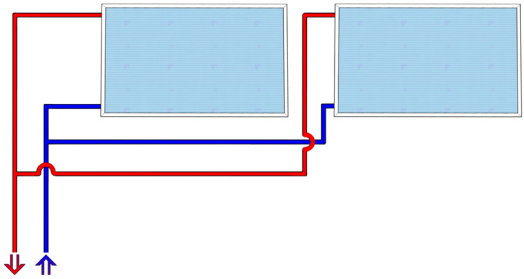
Collector arrays up to 6m² can be connected in series. For arrays greater than 6m², the collectors should be connected in parallel. Should the pump station you choose not incorporate a de-aerator, automatic air vents should be fitted at the highest point on the solar circuit. Similarly, if the pump station does not incorporate a flow rate adjuster install such a component on the cold feed to each connector. Observe slight rises in the pipework to remove air pockets in the system.



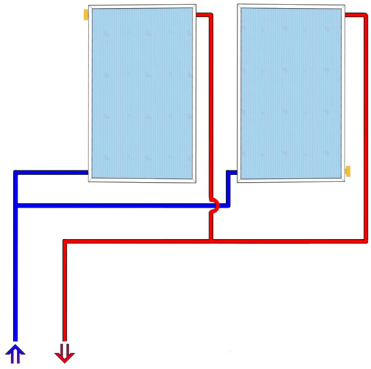
Serpentine in Series



Header and Riser in Series

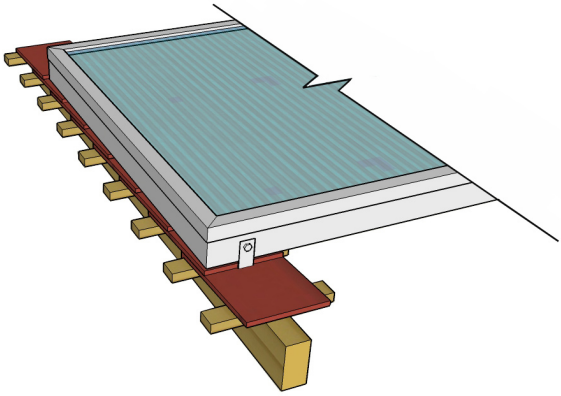


Serpentine in Parallel



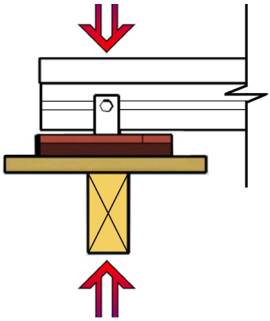
Header and Riser in Parallel

3.3 Flat Bar Brackets - Pitched tiled / slated roofs

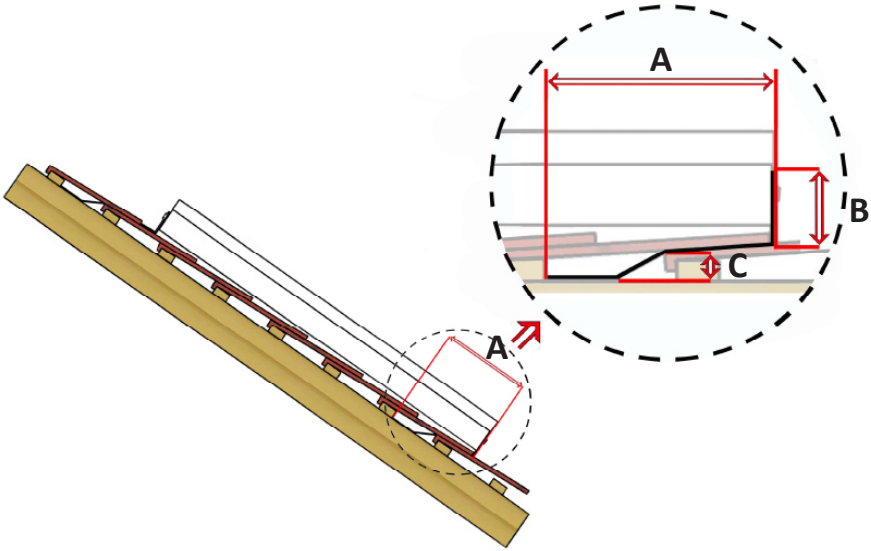


Captive nuts are located on the top and bottom edges of the collector. These nuts are moveable along the sides of the collector, so brackets can be spaced to suit. Each collector is supplied complete with fixing brackets; the number of fixings will vary according to the size of the collector. The collectors need to be positioned horizontally to ensure no air can be trapped in the system:

- Mark with chalk the position of each fixing bracket on the roof to suit the size of the collector. It is the tile above the chalk line that you will be removing.
- Along these two horizontal chalk levels you need to locate the rafters beneath to ensure a firm interface between collector and building. Rafters typically have a centre-to-centre span of either 400mm, 450mm or 600mm.
- Once the tiles are removed the rafters will be easily recognisable. Take care not to damage any weatherproof membrane. If the roof has sarking you will be able to locate the rafters below by the nailing patterns on the surface, but be sure to cross reference with your initial measurements before any drilling takes place.

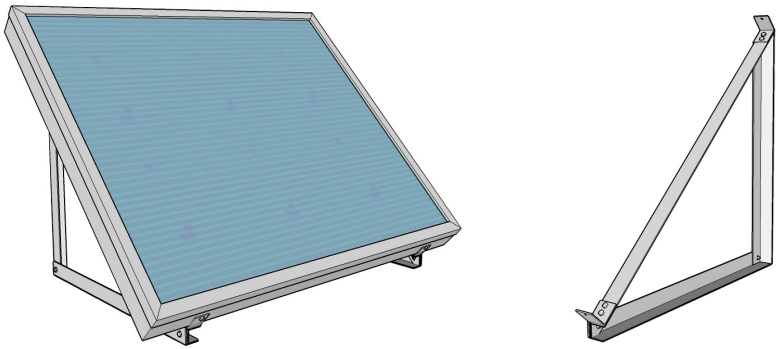


- Begin with the lower brackets: With the tile/slate removed, measure the distance between the mark on the front of the tile lathe supporting the raised tile and the front of the collector(A).
- Measure the height between the rafter/sarking and the top of the marked tile (C) and note the height between the lowest part of the tile and the fixing channel on the side of the collector (B), this upturned length being a minimum of 60mm.
- At ground level, using a mallet and block of wood, carefully form the end of the fixing brackets through 90° to give dimension (B).



- All the lower brackets will be of this same dimension and may be similarly formed.
- Screw the brackets into the rafters to a depth of at least 75mm using two zinc-plated woodscrews and fix the upper tile back into place.
- The process may now be repeated with the upper fixings, however in this instance dimension (A) will need to be fine-tuned to suit the dimensions of the collector, ensuring a closefit.
- The collector should now be lifted on to the roof, placed in between the fixing brackets and fixed in place by means of the M8 x12 set screws and captive nut. You need to leave a minimum gap of 5mm between roof and collector to maintain an airflow, thus preventing the collection of debris whilst also allowing snowmelt to drain between the collector and tiles.

3.4 A-Frame



AES manufacture an A-frame bracket suitable for tilting collectors at the optimum angle on flat roofs or on the side of buildings. The flat roof A-frame must be adequately bolted or weighted down. If screwing or bolting into the structure use metal sleeved anchors combined with rubber washers to provide a strong weatherproof seal.
If the supporting frame is secured by weights, rather than being screwed down, ensure permissible roof loads are not exceeded under any circumstances, if necessary a structural engineer must be consulted beforehand. If the collector is to be mounted to an external wall ensure that the wall is suitable to carry the load. When allocating where to site the collectors in all instances design to minimise the pipe runs to maximise system efficiency.

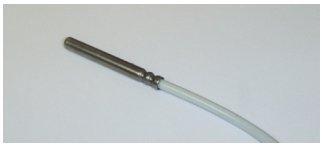
3.5 Other Roof Types

For other roof types (e.g. Steel Profile) AES can supply an L-Bracket fixing that can be bolted/screwed through the roof fabric. Mount the shorter face of the 'L' to the fabric of the building using three coach screws or bolts. Both the holes in the bracket and the roof should be pre-drilled. Mount the collector to the longer face of the 'L' with two M8 x 12 set screws into the captive nuts. The lower brackets should be orientated to have the collector covering the roof fixing screws/bolts, the upper bracket are left at your discretion.
If the substructure has been penetrated, it must be carefully re-sealed in accordance with the roofing manufacturer's specification. Specialist roof manufacturers may have specific seam clips for their roof types, which can be bolted to the collector, contact the roof manufacturer direct.
There is the option of using the L-Bracket for a tiled or slated roof, however great care must be taken to ensure weathertightness. We recommend the use of an appropriate waterproof roofing sealant, elastomeric to flex with any movement, applied liberally to the underside of the bracket before fixing down.

3.6 Running Pipework through the Roof

Drill a suitably sized hole through the respective tiles/ slates through which you wish to run the pipework and sensor cable.
Place a lead or aluminium-weathering slate directly above the hole, available from AES, ensuring when positioning that the top edge is lapped under the tile above and dress to shape. Run the pipework and sensor cable through the rubber sheaths.

Fit the temperature sensor into the housing of the collector, pushing it in by 120mm. Secure it in place using a suitable sealant.

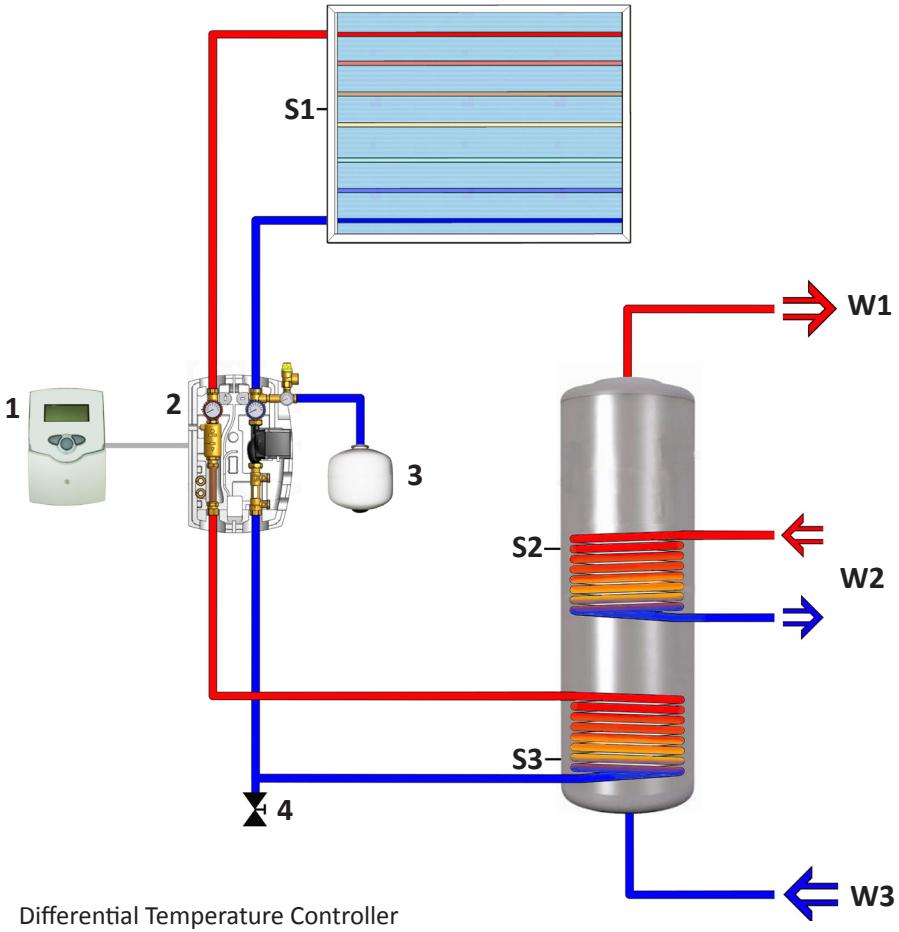


3.7 Lightning Protection:

It is recommended that you use an adequate lightning protection device should the assessed risk on the site be greater than 1 in 100,000.

4. PLUMBING - 2ND FIX:

AES systems are easily integrated with all kinds of conventional heating systems. We provide schematics for various systems (e.g. swimming pool, heat exchanger, multiple-store systems etc.), please contact us.
The diagram below shows a standard system layout incorporating our Solar Thermal Collector with a Twin Coil Cylinder.



1) Differential Temperature Controller
2) Pump Station inc. de-aerator and flowmeter
3) Expansion Vessel
4) Drain Valve
S1) Collector Temp. Sensor
S2) Store Temp. Sensor [Top]
S3) Store Temp. Sensor [Bottom]
W1) Supply to hot water system
W2) Flow and Return from boiler
W3) Cold water supply to cylinder

4.1 Pipe Sizing and Materials

The following pipe diameters (mm) are outline guidelines for pipe sizes for collector arrays.

Collector	Number of Collectors				
	1	2	3	4	5
2.2m	15	15	22	22	22
2.5m	15	15	22	22	22
3.3m	15	15	22	22	28
4.4m	15	15	22	28	28

As temperatures within the solar circuit can exceed 100°C we recommend the use of Copper or Stainless Steel tubing throughout the solar system circuit, do not use soft solder or plastic.

4.2 Suitable Fittings

The following fittings are deemed appropriate for use in the solar system circuit. Soldered or plastic fittings are not recommended:

- Brazed fittings
- Press fittings (rated to withstand temperatures above 150°C)
- Compression fittings
- Stainless Steel fittings

4.3 Sequence of Work

It is important when choosing the location of the equipment to keep the pipe runs as short as possible.

1. Isolate the electrical supply to the boiler and turn off the cold water supply to the heating and hot water systems.
2. Partially drain down the central heating circuit then disconnect and remove the existing cylinder. Replace with the new unit.
3. Connect the boiler flow and return pipework to the upper coil connections.
4. Refill the central heating circuit and bleed off all air as necessary. Check for leaks.

5. Thoroughly flush out and refill the new cylinder, checking all connections for leaks.
6. Connect the solar primary circuit components in the order shown in the layout drawing. If necessary, the pump and expansion vessel may be located in the roof space. A fused spur should be close to the Differential Temperature Controller.
7. Automatic air vents should be located at each high point on the system. No vent is required if filling with a high velocity solar pump filling station. Drain valves should be located at all low points.
8. The discharge port from the pressure safety valve should be piped to a place of safety.
9. All pipework should rise to vent and fall to drain and be adequately supported with pipe clips (do not use plastic clips).

4.4 Notes on Solar Circuit Components

- Automatic air vent & ball valve – Fit at the highest point on the solar circuit. More than one may be required, normally closed after commission.
- Cylinder – In open vented systems where less than 1m head is available the cold feed diameter should be increased to the next size up to avoid drawing air down the vent pipe. For unvented systems the instructions contained in the cylinder manufacturer's installation manual must be followed.
  In mains pressure applications it should be noted that a competent person must undertake installation of the cylinder and a legal requirement that the relevant local authority be informed of the intention to install an unvented hot water - storage system. To achieve satisfactory outlet flow rate for an unvented system it is essential to check the flow rate available from the incoming cold mains.
- Differential temperature controller - To ensure that the customer can easily see the display, choose a convenient location. The sensor cables carry low voltage only and polarity is not important. The sensor cables may be extended using twin core flex / bell wire. Refer to the manufacturer's operating and installation instructions for wiring connections.
- Expansion Vessel – Refer to the manufacturer's instructions. To be located on a 0.5m uninsulated falling spur.
- Fill valve – Under no circumstances should this be connected to the mains water supply.
- Flow setter – The recommended flow rate for a domestic hot water system is 0.5 litre/min/1m² of collector absorber area. When the system is in operation, the flow rate should not exceed 1.0m/s, to ensure noise levels remain comfortable.
- Pressure Safety Valve - Refer to the manufacturer's instructions.
- Pump Station – Refer to the manufacturer's instructions. In most instances this unit will contain the flow setter for the system.
- Drain Valve - To be located at the lowest point of the solar circuit.

5. COMMISSIONING:

Ideally, you want to fill the system when the collector is cold, due to the high temperatures that can be attained, be sure to cover the collector in any case.

Before commissioning takes place it is important to flush the system fully with the anti-freeze solution to remove any impurities, contaminants or debris prior to the final fill:

1. On completion of the primary circuit pipework make sure of the following: -

- All drain cocks are closed.
- Pump isolating valves are fully open.
- Caps on all automatic air vents are slackened one turn.
- Ensure the pressure on the gas side of the expansion vessel is reduced to:

0.5bar + (0.1bar x geodetic height i.e. height from expansion vessel & system high point m)

2. Connect the inlet of the fill valve to a pump filled with antifreeze. Unscrew the knurled knob on the underside of the fill valve and fill the system until a pressure of:

0.5bar + (0.1bar x geodetic height)

3. Check that all fittings are free from leaks.
4. Drain the system through the primary circuit drain valve.
5. Flush and back flush primary circuit until clean and clear.
6. Ensure all fluid is drained completely from the primary circuit (Note: De-activate any non-return valves).
7. Refill the system as previously to required pressure with antifreeze. Always read the solar antifreeze fluid label. Under no circumstances should water be added to premixed antifreeze fluid.
8. Switch on the electrical supply to activate the system. If there is insufficient solar energy the override switch on the controller should be activated. Any air in the primary circuit will now be dissipated through the automatic air vent.
9. The system should be re-pressurised.
10. The circulating pump should be set to operate at the lowest speed possible to achieve the required flow rate: 0.5litres/min/m²
11. Once commissioned the DTC must be left on automatic operation and any automatic air vents isolated.
12. Pipework insulation may now be applied. It is essential to use only high temperature insulation (resistant up to 150°C). Secure in place with cable ties or insulation tape.

On completion of the solar water heating system, the installer must fully explain the function and operation of the system to the end user. The installation, commissioning and maintenance instructions should be passed on to the end user.

An AES commissioning checklist can be found in Appendix 2.

6. **MAINTENANCE**, (To BS 5918 : 1989):

While a properly designed and installed heating system should be expected to give a service life comparable to that of other types of heating systems, some maintenance may be necessary to maintain the efficiency of the installation.

Periodically check the collector for dirt or grime. If required, clean using a soft cloth with a solution of mild soap and lukewarm water.

A maintenance inspection should be carried out annually when the following items should be checked: -

1. The collector for damage both to the glazing and the absorber plate ensuring the glazing seals are weathertight and sound.
2. That the roof fixings are firm and the roof covering is free from cracks.
3. That both the flow and return legs to the collector circuit are free from air.
4. That the weathering is still properly protecting the structure.
5. That all insulation is firmly attached.
6. That no condensation or damp spots are apparent, particularly around the pipes and fixings in the roof.
7. That circulating pump is operating without undue noise or vibration.
8. That electrical controls are operating correctly to manufacturer's instructions.
9. That all sensing devices are firmly and properly in place.
10. That all air eliminators, non-return valves, and solenoid valves and motorised valves are operating correctly.
11. That unions and glands are free from weeps.
12. Ensure that the operating pressure is not dropping below 0.5 bar.
13. That the correct solar fluid volume is maintained.
14. That all covers are in place.

The anti-freeze solution should be replaced at least once every 5-years.

7. WARRANTY:

AES warranty covers the solar collectors against faults in workmanship, manufacture or material failure up to 10 years, providing that the solar collectors were installed in accordance with the AES Installation Manual and the Microgeneration Installation Standard 3001.
No liability can be assumed by AES for improper use or unsanctioned alterations to the system.

8. NOTES FOR THE USER:

You have just become a user of the most important energy source of the future – and yet the oldest one in existence. Correctly installed, it will provide many years of reliable service. The system revolves around the lightweight yet highly efficient AES collector. AES has more than 30 years of experience in this specialist field and selects only the highest quality components for their systems. The solar system contains fluid which transfers heat from the solar collectors to the hot water storage cylinder.
The pipework circuit is subject to a small pressure and should be fitted with all the necessary safety features i.e. expansion vessel and pressure safety valve.
Fully automatic control is by a differential temperature controller (DTC). This unit measures the temperature in the solar collector and, when this is (typically) 6°C hotter than the temperature in the lower half of the cylinder switches on a circulating pump in order to transfer the heat. When the temperature difference has fallen to 4°C the pump is switched off. The collectors are protected and solar benefit will be had all year round because the fluid in the system contains anti-freeze. The DTC automatically controls the operation of the circulating pump and, at the same time, provides a digital temperature read-out. Please refer to the DTC manufacturers instruction manual for operation of the controller.

For satisfactory operation of the system the following points should be observed: -

- The system should always be left switched on even when the house is unoccupied. This will ensure that the fluid in the collectors does not boil and evaporate, which will possibly result in a service call.
- If the property is to remain unoccupied for a lengthy period of time then the solar panels should be covered.
- Periodically check the pressure gauge. When installed, the system is pressurised. This will vary continually according to the temperature in the collectors. If the pressure falls below 0.5 bar, however, a service call will be required.
- To maximise solar gain, it is advised that auxiliary heating (e.g. gas boiler) is switched off during daylight hours.

Important Information:

Limescale

In hard water areas the high temperatures experienced in solar cylinders can result in the accumulation of limescale. As a means of control, the differential controller can be set with a maximum store temperature of 60°C. Limescale build-up will not occur within the closed loop of an indirect solar circuit.

Legionella

At temperatures between 20°C and 46°C there is an increased risk of legionella bacteria growth within the DHW system. In order to combat the risk of legionella bacteria growth, the water temperature needs to be raised to at least 60°C once per day. For days with little solar availability and for winter months there needs to be an auxiliary means of raising the temperature of the domestic hot water to at least 60°C. This form of sterilisation should be accurately controlled by time and temperature to maximize solar gain e.g. the electric immersion or boiler should operate during non-daylight hours or periods of peak DHW draw-off.
The following formula is used to determine the minimum time of operation for the auxiliary heating to ensure sterilisation:

Minutes = (Cylinder capacity in litres x 4.2) / kW

Temperature Controls

A solar system can at times produce scalding water or even high pressure steam. For your safety within the primary circuit a suitably sized expansion vessel and pressure relief valve are fitted. The secondary circuit safety features include a dedicated solar volume of no less than 25 litres per 1m² of solar collector aperture and a maximum store temperature on the differential temperature controller, factory preset at 60°C.
A further safety feature for vulnerable groups, such as children or the infirm, is the use of a thermostatic mixing valve either at or within 450 mm of the point of use set no greater than 46°C or at the hot water cylinder set at 55 – 60°C.

General

The solar water heating system should meet the requirements for electrical earthing and bonding in accordance with IEE Wiring Regulations.
Only competent person(s) should undertake any maintenance, decommissioning or repair work. Necessary skills are required in plumbing, electrical, roof work and access work. Individuals should have a high level of technical knowledge, be familiar with tools of the trade and have experience in current best practice.

9. DECOMMISSIONING

1) Cover the collectors.
2) Switch off the electricity supply to the differential controller and pump.
3) Release the pressure in the solar circuit loop. This can be done by manually releasing the pressure relief valve.
4) Remove the air vent.
5) Drain system from the drain valve, located at the bottom of the solar circuit loop.
6) The system is now decommissioned.

Decommissioning the system in the early morning or late evening is recommended as the panel will not have had the chance to heat up fully, so there will be less chance of burning yourself on steam or pipe work. If this can not be done then take great care, and be aware that there could be a burst of steam when you take any component off.

Remember that the non-return valve will have liquid above it so it will not naturally drain. You will need to remove / bypass / disable it, too fully drain the system.

Even after the solar water collector(s) has been drained, residual hot water or steam may still come out, sometimes in sudden bursts, for hours or days afterwards, more so on particularly in bright or sunny weather. Pipes connected to the collector may get very hot, up to and above 100°C. The solar collector(s) should remain covered with the air vent(s) removed.

10. TROUBLESHOOTING

Problems:

Controller display blank
Fault reading on LCD Display
Pump will not run
Pump is running continuously
Pump switches on-off for short moments
System has no circulation
Pressure drops in system
Overheating
Performance Loss
Temperature sensor showing incorrect reading
Domestic hot water too hot
Domestic hot water not hot enough
Store Cools down at night

| | | |

11. APPENDIX:

Solar standards:

BS 7431 – Method for assessing solar water heaters. Elastomeric materials for absorbers, connecting pipes and fittings
BS 5918 – Solar heating for domestic hot water
BS 6785 – Code of practice for solar heating systems for swimming pools
BS EN 12975 – Thermal solar systems and components – Solar collectors
BS EN 12976 – Thermal solar systems and components – Factory made systems
DD CEN/TS 12977 – Thermal solar systems and components – Custom built systems

Other relevant standards:

BS 1566 – Copper indirect cylinders for domestic purposes
BS EN 13831 – Specifications for expansion vessels using an internal diagraph for sealed hot water heating systems
BS 5422 – Methods of specifying thermal insulation materials on pipes, ductwork and equipment in the temperature range of -40ºC to 700ºC
BS EN 12828 – Specification of forced circulation hot water central heating systems for domestic premises. (Also BS EN12831, BS EN 14336)
BS 5534 – Code of practice for roofing and tiling – Design.
BS 5546 – Specification for installation of hot water supplies for domestic purposes,
using gas-fired appliances of rated input not exceeding 70 kW
BS 5970 – Code of practice for thermal insulation of pipes and equipment
BS EN 1991-1-4 – Actions on structures. General actions. Wind actions.
BS EN 62305 – Protection against lighting. General principles
BS EN 806-4:2010 – Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.
BS 6701 – Telecommunications equipment and telecommunications cabling
BS 6920 – Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water
BS 7074 – Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems
BS EN 12897 – Water supply. Specification for indirectly heated unvented (closed) storage water heaters
BS 7671 – Requirements for electrical installations. IEE Wiring Regulations
BS 8000 – Workmanship on building sites.
BS EN 12828 – Heating systems in buildings – Design for water-based heating systems
BS EN 12831 – Heating systems in buildings – Method for calculation of the design heat load

Regulations:

Confined Spaces Regulations 1997
Construction (Design and Management) Regulations 1994
Construction (Health, Safety & Welfare) Regulations 1996
Construction Regulations (Head Protection) 1989
Control of Substances Hazardous to Health Regulations 1994
Electricity at Work Regulations 1989
Health & Safety at Work Act 1974
Health and Safety (First Aid) Regulations 1981
Lifting Operations and Lifting Equipment Regulations 1998
Local Building Regulations
Local Water Bylaws
Management Health & Safety at Work Regulations 1999
Manual Handling Operations Regulations 1992
Noise at Work Regulations 1989
Personal Protective Equipment at Work Regulations 1992
Provision and Use of Work Equipment Regulations 1998
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995

Commissioning Checklist

Customer Details	
Name	
Installation Address	
Town & Postcode	
Telephone Number	

Installer Details	
Company Name	
Address	
Town & Post Code	
Telephone Number	
E-mail address	
Website	

System Summary	
Solar Collector	
Cylinder	
Pump Station	

Commissioning Checklist			
No	Check	Entry	Units/Comments
1	Panel Serial Number		
2	Primary pressure limit of weakest component		Bar
3	System pressure setting adjusted when cold		Bar
4	Primary circuit operating pressure		Bar
5	Minimum primary pressure limit before user action required		Bar
6	Fuse Rating		Amps
7	Controls and sensors operating correctly		Tick
8	DTC Δt setting to switch on		°C
9	DTC Δt setting to switch off		°C
10	DTC setting of high temperature limit		°C
11	Expansion vessel pre-charge		Bar
12	Expansion vessel capacity		Litres
13	Circulation rate setting		Litres/minute
14	Primary circuit volume		Litres
15	Earth bonding present		Tick
16	Cylinder temperature sensors secured		Tick
17	Operation of pressure safety valve		Tick
18	Operation and direction of non-return valve		Tick
19	Security of collector fixings		Tick
20	Weather sealing of roof / wall penetrations		Tick
21	All insulation in place		Tick
22	Function of automatic air vent		Tick
23	Pump speed		1,2 or 3
24	Method of anti-scalding in DHW distribution		
25	Location of DHW isolation valve		
26	Location of primary system pressure guage		
27	Location of pressure safety device		
28	Location of fused isolating switch		
29	Location of automatic air vent		
30	System demonstrated to customer		Yes, Name/No
31	Customer documentation explained and handed over		Yes/No

Declaration (to be completed by the installer):

I confirm that the above system has been installed and commissioned at the above address.

The system design is in line with current best practice and the system is installed in such as manner as to comply with the Microgeneration Certification Scheme Standard MIS3001 and with all legal requirements. All notifiable works have been carried out by suitably qualified personnel and have been notified to the relevant authorities.

Signed: _____ Print Name:_____

Date of Commissioning: _____

Declaration
(to be completed by the client):

I confirm that the above system has been installed at the above address. The system has been explained and demonstrated to me and I am satisfied that the installation is complete.

Signed: _____ Print Name: _____

Acknowledgements:

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